NUTRITION FOR THE EDGE

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INTRODUCTION

- 1) General Nutritional Requirements for the Service Member
- 2) Nutritional Requirements for Environmental Extremes
- 3) Supplements

AR 40-25/AFR 160-95/NAVMEDCOMINST 10110.1

- AR 40-25: Military Dietary Reference Intakes (Draft, 1999)

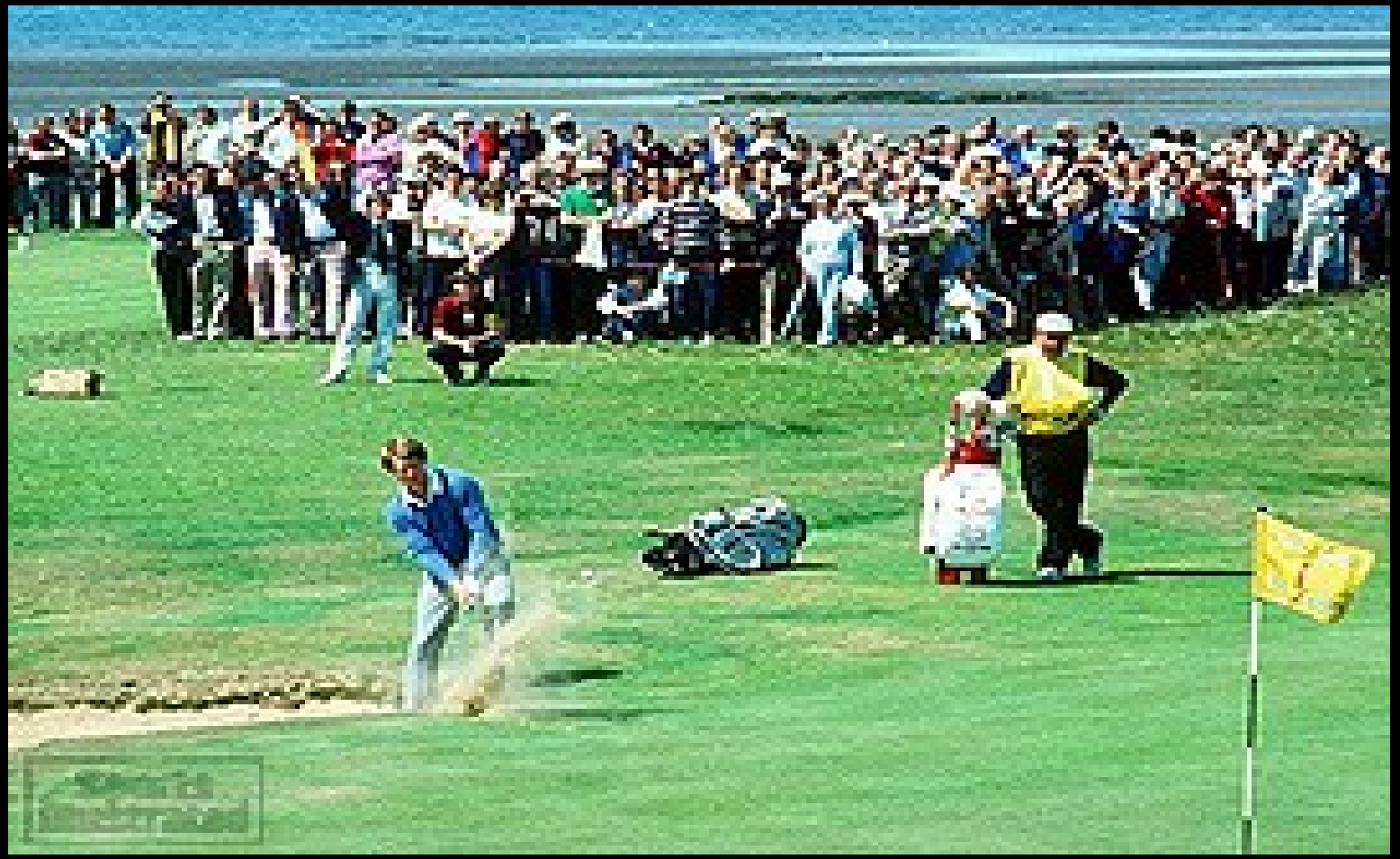
(Reference Man-79 kg; Woman-62 kg)

Energy	Men	Women
→ General	3250	2300
Light Activity	3000	2200
Moderate Activity	3250	2300
Heavy Activity	3950	2700
Exceptionally-Heavy Activity	4600	3150

ACTIVITY

3000 cal for ref man; 2200 cal for ref woman

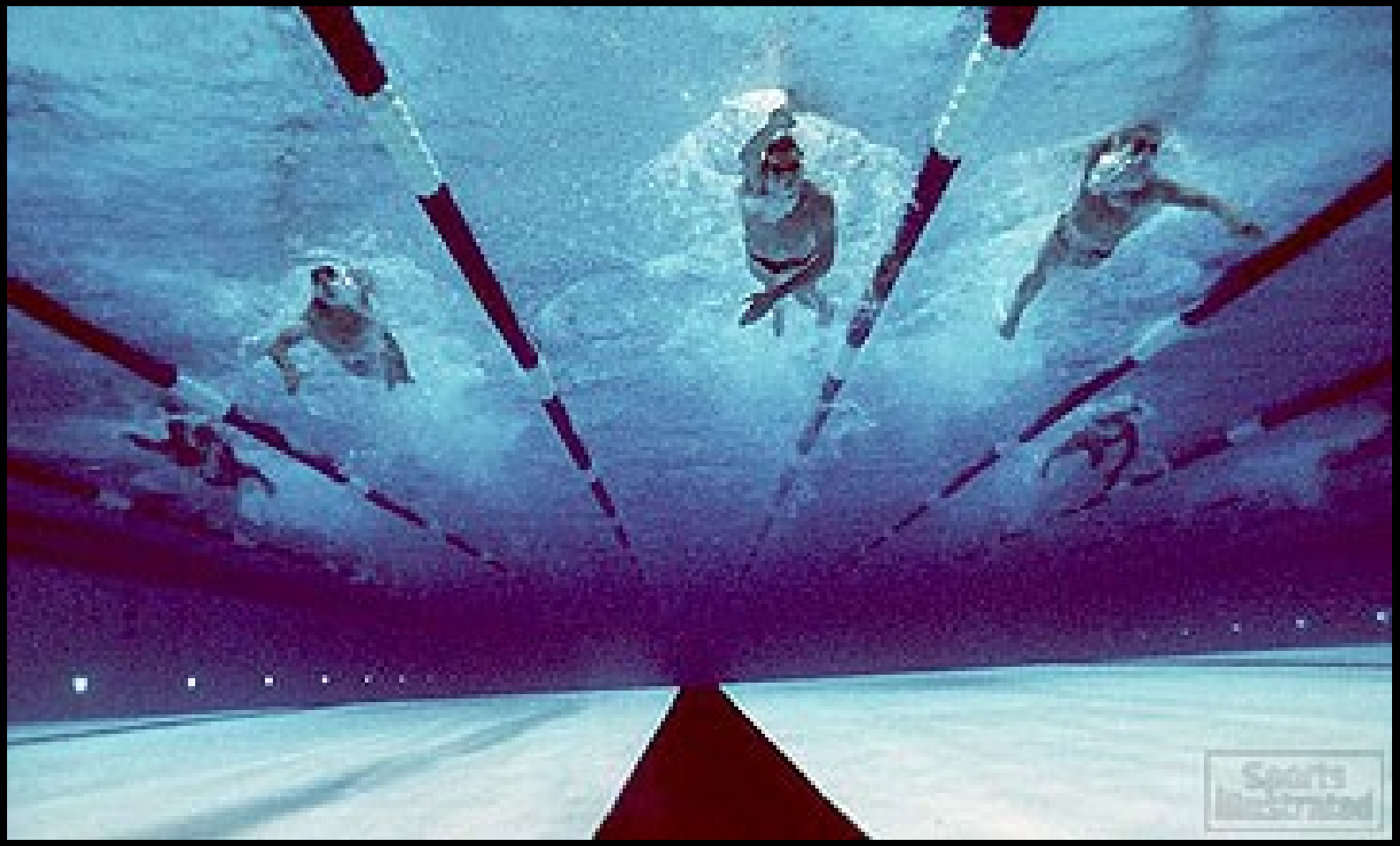
EXAMPLE OF LIGHT ACTIVITY



ACTIVITY

3250 cal for ref man; 2300 cal for ref woman

EXAMPLES OF MODERATE ACTIVITY



ACTIVITY

3950 cal for ref man; 2700 cal for ref woman

EXAMPLES OF HEAVY ACTIVITY

EXCEPTIONALLY HEAVY ACTIVITY

4600 cal for ref man; 3150 cal for ref woman

EXCEPTIONALLY HEAVY ACTIVITY

ENERGY EXPENDED

Training	**Energy Expended**
→ Competitive athlete in training	3000-6000
Military Basic Training	3000-4000
Marine OCS	3600-4800
Army Ranger School	3600-4800
Navy SEAL training	4000-5000
Mountain training	4600-6000
Arctic field training, infantry	3000-4000
SOF recce, inc, in & exfiltation	3000-3700

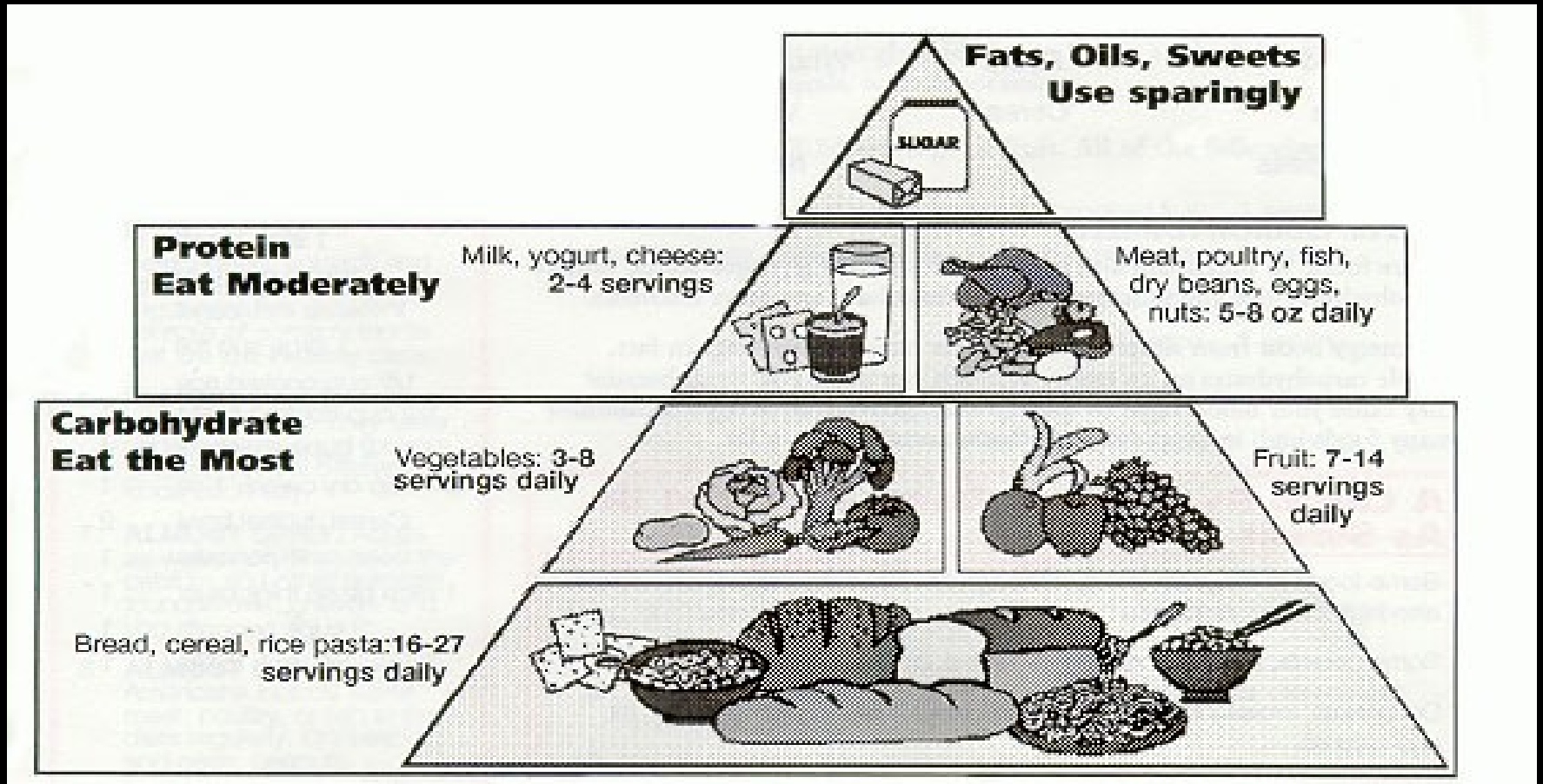
Basic Training--3000-4000 calories/day

Marine OCS:3600-4800 calories/day

Crucible: 4725-6130 calories/day

SEAL Training: 4000-5000 calories/day

PERFORMANCE PYRAMID



EXAMPLE OF 3500 CALORIES /DAY

- **BREAKFAST**
- 12 oz OJ, Whole Banana
- Whole Bagel, 2 bx Cornflakes
- 8 oz carton Fruit Yogurt
- 1 pint Low Fat Milk
- Pkg of Cream Cheese

DINNER

Lg Plate Spaghetti with 3 Meatballs

Asparagus with Cheese Sauce

Tossed Grn Salad w/ Ranch Dressing

Peach Crisp

2 Slices of Toasted French Brd

1 pint LF Milk

- **LUNCH**
- Whooper
- Fries
- Choc Shake
- Lg Apple

EVENING SNACK

2 Granola Bars

Dove Bar

MILITARY RATIONS

- MREs
- Tray Rations
- Unitized Group Rations

FIELD FEEDING POLICY

- **GOAL:**

- Service members receive three quality meals each day with at least one cook prepared meal (UGR-A), METT-T dependent. The remaining two meals are provided from the other operational rations--MREs and UGR- Heat & Serve.

MREs
1300 calories/serving

TRAY RATIONS
1420 calories/menu

(UGR)
1450 calories/meal

PROTEIN (CONT)

- **SUGGESTED NEEDS (Lemon*)**

	Endurance	Strength
Rec protein	1.4 gm/kg	1.8 gm/kg
Rec total/day	111	142

- **Lemon, PWR, `Do Athletes Need More Protein,' Internatl J Sport Nutr, 5:S39-61, 1995.**

NUTRITIONAL REQUIREMENTS (CONT)

- Protein:

Men	Women
→ 91 Gm (63-119)	72 gm (50-93)

→ Range for reference man and women:
0.8 to 1.5 gm/kg body wt

NUTRITIONAL REQUIREMENTS (CONT)

- Fats:

→No MDRI for fats

→30% or less calories for general health benefits

NUTRITIONAL REQUIREMENTS (CONT)

- Carbohydrates

- No MRDI for carbohydrates
- 50-60% of total calories from carbohydrate for general health benefits

SUMMARY

- Macronutrient Content of Intake

→ Protein: 12-15% of caloric intake
0.8-1.5 gm/kg body wt

- Fat: 30% or less of caloric intake
- CHO: 60% of caloric intake
minimum of 400 gm per day

MICRONUTRIENTS

NUTRITION: A FORCE MULTIPLIER

VITAMIN AND MINERAL FORTIFICATION

Nutrient levels in the MRE are based on the Recommended Dietary Allowances (Daily Values) which are adapted to meet operational requirements.

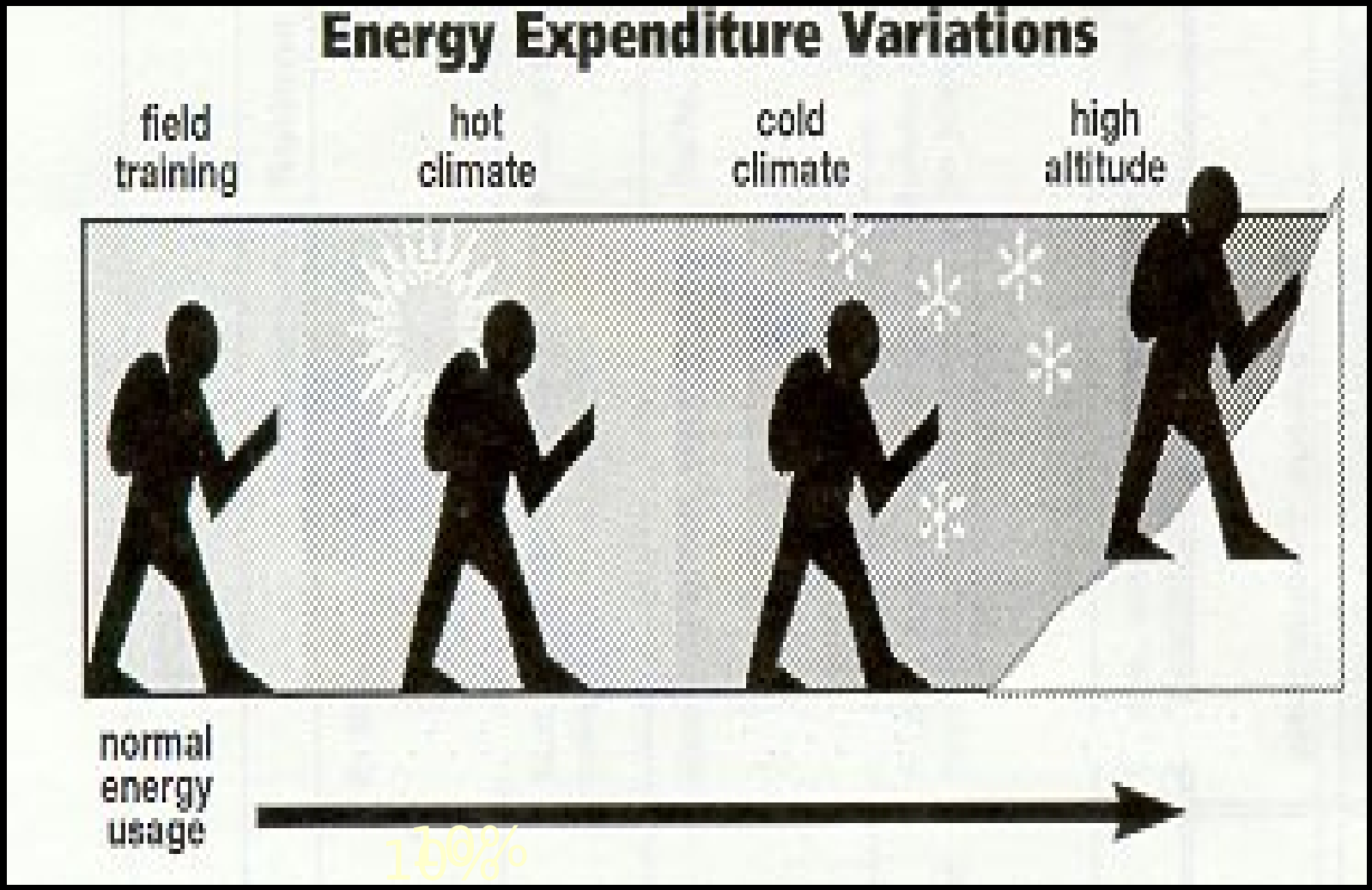
Fortification Maximizes the Nutrition of the Ration by Adding or Increasing Vitamins and Minerals within some Ration Components.

Fortification Provides you the Additional Edge to Maximize Your Performance.

The table below shows fortified MRE components. The X shows which vitamins and minerals have been added to a specific component. These components should always be eaten:

RATION COMPONENT	VITAMINS						MINERALS	
	A	C	B1	B2	Niacin	B6	Calcium	Iron
Beverage Base		X					X	
Cocoa Beverage	X	X	X			X		
Cheese Spread	X	X	X			X		
Jalapeño Cheese Spread	X	X	X			X		
Peanut Butter	X	X	X			X		
Crackers			X	X	X	X	X	
Oatmeal Cookie Bar								X
Chocolate Covered Cookie	X	X	X			X		
Fruits		X						

NUTRITIONAL NEEDS AT ENVIRONMENTAL EXTREMES



NUTRITIONAL NEEDS IN ENVIRONMENTAL EXTREMES

- **Heat:**

→ Energy requirements increase up to 9% at 104º F

 Protein requirements NOT in excess of MDRI

- **Cold:**

 Basal energy requirements ↑10-15%

 Protein requirements NOT in excess of MDRI

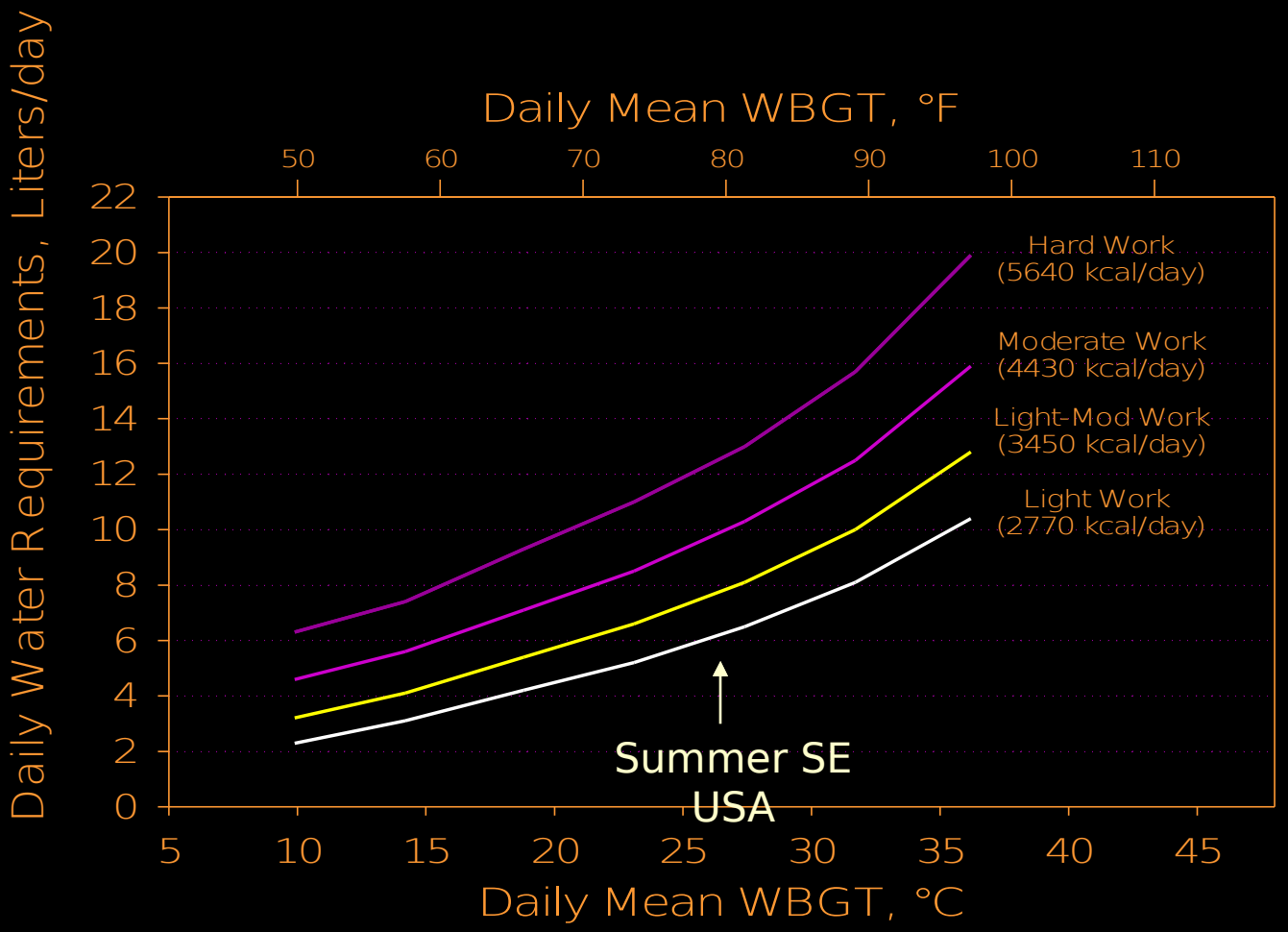
- **Altitude:**

 Basal energy requirements increase at least 17%

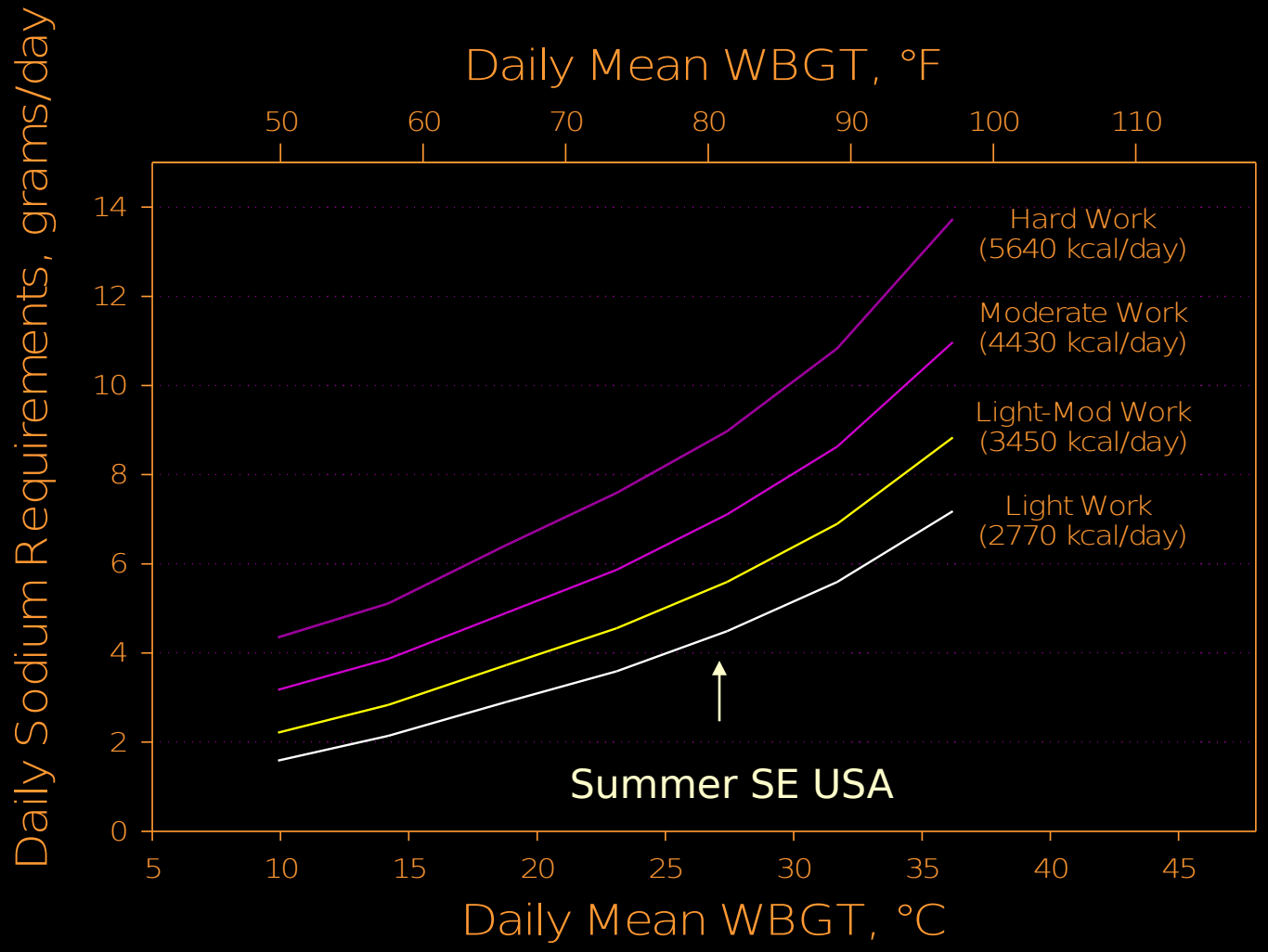
 Protein requirements NOT in excess of MDRI

ENERGY EXPENDITURES AT EXTREMES -- HEAT

WATER REQUIREMENTS



SODIUM NEEDS



ENERGY EXPENDITURE AT EXTREMES-COLD

ENERGY EXPENDITURES AT EXTREMES-ALTITUDE

ACUTE MOUNTAIN SICKNESS

- A symptom complex caused by rapid ascent

- Cumulative Incidence :

→ 8-100% (by literature)

- Individual susceptibility
- No gender differences
- Rate development depends upon state of acclimation

ACUTE MOUNTATIN SICKNESS (CONT)

- Signs and Symptoms :

➞ Onset 3-12 hours

- Peak Symptoms 24-48 hours
- Resolution 3-7 days (but as long as 30 days)

- Physical Presentation:

- Ha
- N/v
- Anorexia
- Malaise

CHAMBER STUDY

IMPORTANT NUTRIENTS AT ENVIRONMENTAL EXTREMES

- **Heat:**

→ Adequate fluid

- **Cold:**

 Adequate calories

- **Altitude:**

 Adequate calories

 High carbohydrate diet during initial stages

SUMMARY

- Percentage protein, fat, CHO remains largely the same at all environmental extremes; energy increases for activity

INTAKES IN THE FIELD

- Soldiers do NOT consume adequate calories in the field
  - decrements in performance

INTAKES IN THE FIELD

- Studies Undertaken

		EE	EI	Proportion
1986	Temperate	3480	2960	85%
1988	Cold, Alt	4900	3132	64%
1990	Cold, Alt	4557	2358	52%
1991	Cold	4250	3330	78%
1998	Temperate		2300	?%

INTAKES IN THE FIELD(CONT)

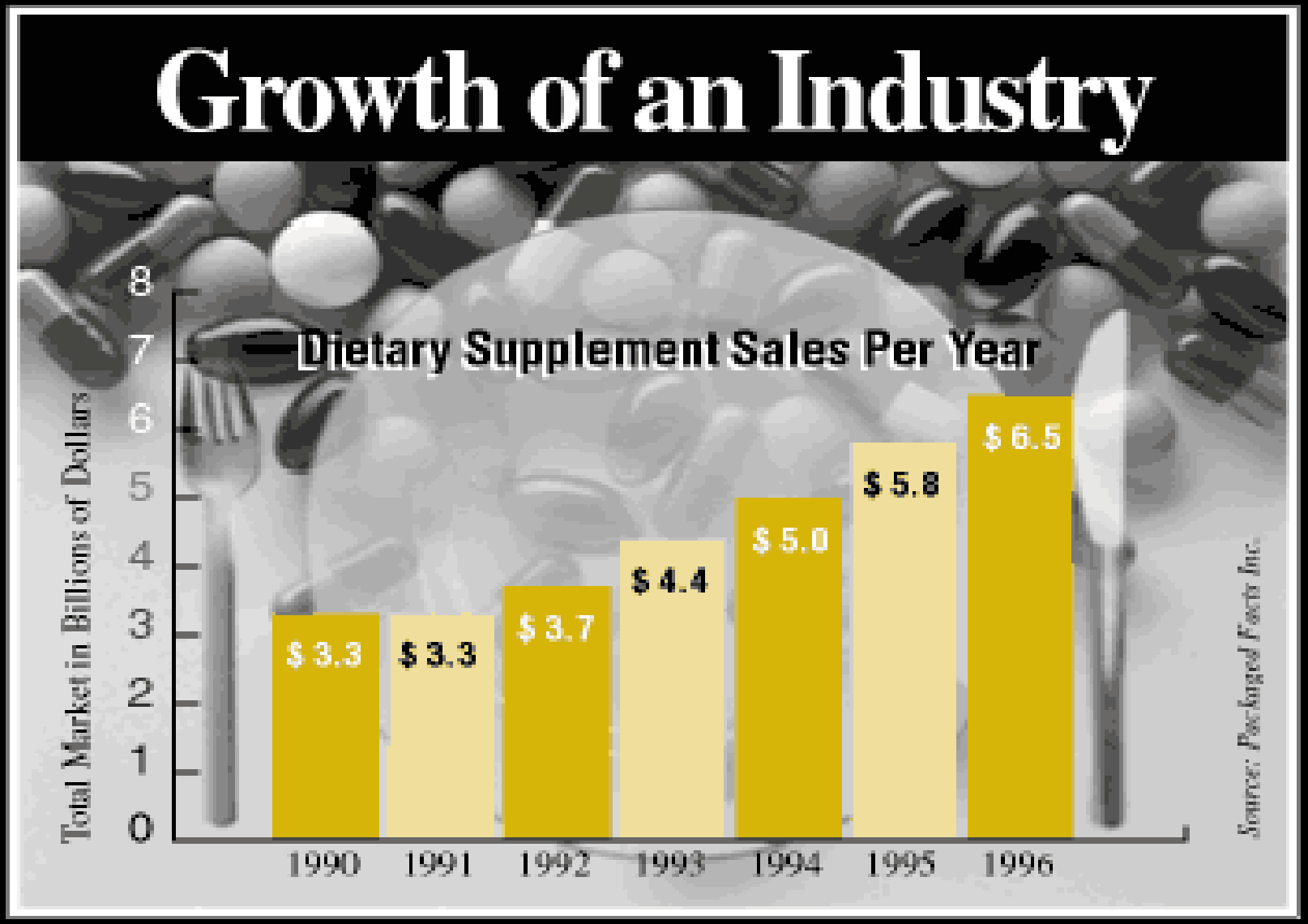
- Several contributory factors
- → Ration
- Training Schedule
- Environment
- Command Emphasis

INTAKES IN THE FIELD (CONT)

- Methods to increase consumption

- Schedule feeding times
- Group feeding
- Hot Meals
- Delivery of meals

SUPPLEMENT USAGE



SPORTS SUPPLEMENTS

- $1.6 billion spent on sports supplements
- $100 million creatine sales in 1997
  - $600,000 spent in AAFES Ap-Oct, 1998

MILITARY SUPPLEMENT USE

- 78% Navy SEALS
- 64% Army Ranger students

MILITARY SUPPLEMENT USE (CONT)

- Reasons for Supplement ingestion:

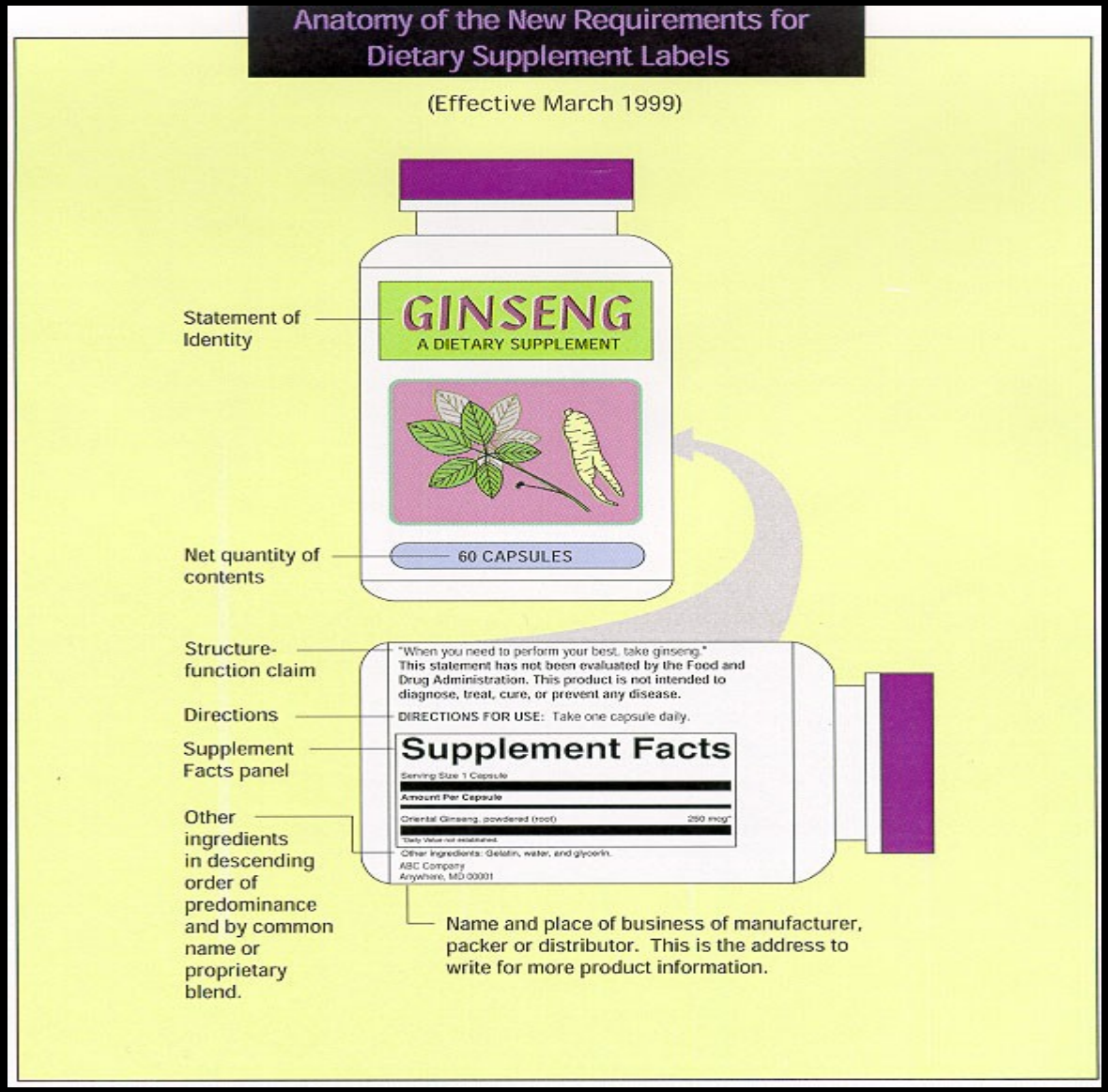
- increase muscle mass, strength, power
- provide an energy source
- improve general health

MILITARY SUPPLEMENT USE (CONT)

- Commonly Used Supplements

- Sports bars
- Multi-vitamins
- Creatine
- Amino acid or protein supplement

SUPPLEMENT LABELS


Anatomy of the New Requirements for Dietary Supplement Labels
(Effective March 1999)
Statement of Identity
GINSENG
A DIETARY SUPPLEMENT
Net quantity of contents
60 CAPSULES
Structure-function claim
"When you need to perform your best, take ginseng."
This statement has not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
Directions
DIRECTIONS FOR USE: Take one capsule daily.
Supplement Facts panel
Supplement Facts
Serving Size 1 Capsule
Amount Per Capsule
Oriental Ginseng, powdered (root) 250 mg*
*Daily Value not established.
Other ingredients in descending order of predominance and by common name or proprietary blend.
Other ingredients: Gelatin, water, and glycerin.
ABC Company
Anywhere, MD 00001
Name and place of business of manufacturer, packer or distributor. This is the address to write for more product information.

SUPPLEMENT USAGE

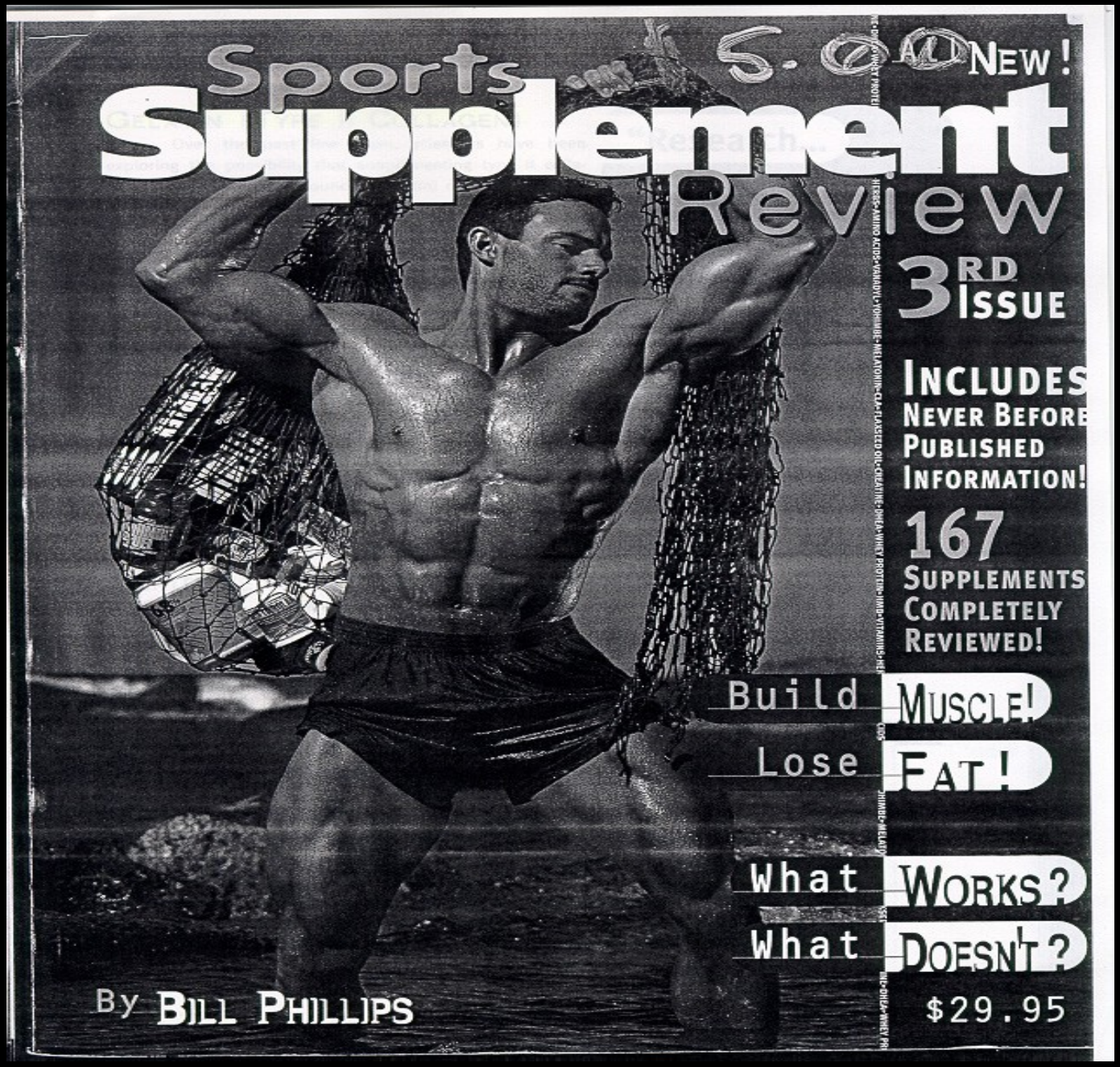
- Supplements used to give an `edge’
- Promote muscle growth and/or facilitate loss of body fat
- Enhance performance and reduce injuries
- Supplements include vitamins, minerals, amino acids, steroids, herbs, lipids, antioxidants

CLASSIFICATION OF INGESTED PERFORMANCE AIDS

- **Nutritional**
- **Pharmacological**
- **Physiological**
- **Psychological**
- **Mechanical or Biomechanical**

SYSTEMATIC PROBLEMS WITH PRODUCT EVALUATION

- Limited scientific studies
- Variable dosages
- Variable product purity and combination of multiple ingredients in one product
- Apocrypha


Sports
Supplement
Review
5.0 ALL NEW!
3RD ISSUE
INCLUDES NEVER BEFORE PUBLISHED INFORMATION!
167 SUPPLEMENTS COMPLETELY REVIEWED!
Build MUSCLE!
Lose FAT!
What WORKS?
What DOESN'T?
By BILL PHILLIPS
$29.95

GROWTH FUNDS

How to get the best supplements on a limited budget

BY JEFF O'CONNELL
Staff Writer

The supplement industry's R&D labs have developed some remarkable products in recent years, but as the pace of new-product introductions has accelerated, the amount of money you can spend on supplements has increased, too. In fact, buying a representative sample of what you see advertised in muscle magazines could quickly turn your monthly supplement investment into something resembling a car payment.

Unless you're one of the fortunate few for whom money is no object, this situation might present a bit of a dilemma. Yet by doing your homework and applying some common sense and logic to your supplement strategy, you can almost always either save money or get more bang from the same buck.

Prioritize

Once you establish a realistic monthly budget for supplements, the first step is to sort through the myriad products available to identify those best suited to the physique you're trying to build. If muscle growth is your goal, your A-list of supplements might include creatine, glutamine, protein powder and possibly branched-chain amino acids (BCAAs). If consuming 5–6 meals a day is difficult for you, consider adding a daily meal-replacement shake or two to the mix as well. As their name suggests, meal replacements are designed to provide a nutritionally complete substitute for meals, so if you use them for that purpose — rather than as a source of extra calories and protein for weight gain — you may save money you'd normally spend on food.

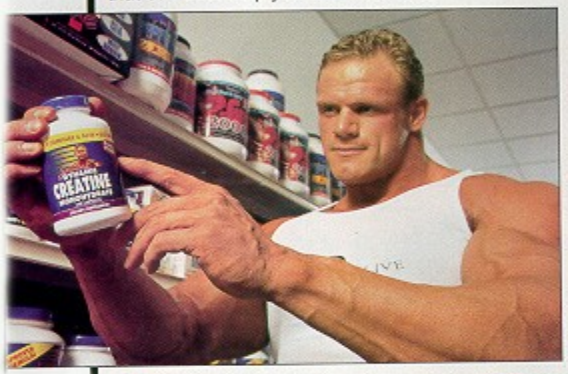
For those whose primary interest is losing weight, store shelves are filled

Photos by Robert Reiff Mosier/Jeremy Freeman

A DOLLARS-&-SENSE APPROACH TO SUPPLEMENTS

▲ Set a realistic monthly budget.

▲ Determine your physique goals and identify those supplements that can best help you achieve them.



◄ Learn to read labels so that you know what you're buying and can avoid redundancies.

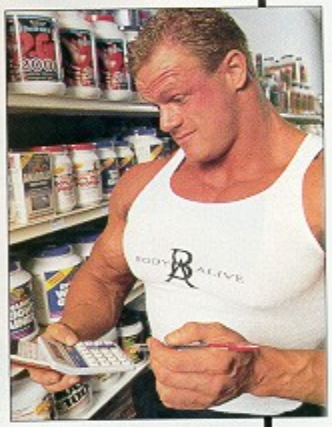
▲ Emphasize supplements, like creatine, that would be difficult to reproduce from natural food sources.

▲ Plan your purchases in advance.

► Seek the best deal on the supplements you want. Compare retail prices to mail-order prices.

▲ Look for supplement deals at bodybuilding contests and trade shows.

▼ Purchase in bulk whenever possible, hooking up with friends to buy as a group if necessary.



▲ Use the most efficient serving size. If you're smaller than average, for example, you can probably save money by reducing your serving size accordingly.

▲ Use what you buy. If you don't like the way something tastes, mix it with different fruit and/or juices until you come up with a combination that you find palatable.

MILITARY SUPPLEMENT USE COST

- SEALs: ≥ $25/month
- Ranger students: ≥ $26/month

As a Cyclist and/or Tri / Bi / Duathlete your calorie burn rate and therefore nutrition consumption and replenishment rates are some of the highest. What sets us apart are the distances, durations and their demands. The burn and consumption rates for cyclists and triathletes tip the scale a bit. With that said, we decided to help make things a little easier and created Athletica packages. They include all the products you need for before, during and post activities. We include special instructions for use beyond what is written on the product packages themselves. Consumption,

CYCLING

burn rate and replacement - Calories are units of energy. The body stores 365 grams (1500 calories) of carbohydrates in the form of muscle and liver glycogen to draw on during training and event activity. When cycling at 18-20mph the burn rate is 600-800 calories of energy per hour. This means that on the bike without supplemental intake (replacement) you will be out of fuel within a two hour period. As a multi-sport athlete, on the 5 hour per day training regimen, your burning 5,000 to 8,000 calories in the process. On average as endurance athletes we expend on average between 3,000 and 4,000 calories daily. The importance is to not let your body, during training and/or event activity, reach these low levels. These low levels impede performance improvement, and PR goals, which is why we train so hard.

Following is a listing of suggested products by usage category.

Before
1. Metabolol
2. Thermadrol X
3. Pro Hydrator
4. OXI-PRO
5. Muscle Nitro
6. Power Creatine
7. R1 Ultima
8. Succeed! PreRace Caps

During
1. Cytomax
2. Race Day
3. PR Solution
4. Met-Rx Rehydration
5. Pro Enhancer
6. Power Bars and Gel
7. Clif Bars and Clif Shot (gel)
8. GU
9. Hammer Gel
10. Fireball Gel
11. Ultima

After
1. PRO-SCORE 100
2. Pure Whey Protein
3. Met-Rx Protein Powder
4. PR Powder and Ironman Bars
5. Met-Rx Food Bars
6. Met-Rx Source/One Bars
7. Jog Mate
8. Succeed! Recovery Caps
9. GeniSoy Powder and Bars

Johnathan Sandt
Saturn Super Cup Race/Seattle Course

B. Athletica Tri/Bi and Duathlete Pack

As in the cyclist category, depending on you level of intensity, this is a 4 to 6 week supply. This package was created from the experiences of several of our multi-sport athlete friends and associates, who by the way have recruited a couple of us to do an X-terra and triathlon this coming season. No rest at all this winter.

1 case Bar Sampler
1 case Gel Sampler
1 bottle Succeed! PreRace
1 can Met-Rx Rehydration
1 box Race Day
1 6pk Pro Enhancer
2 bottles Pro Hydrator
1 case Ironman Bars
1 can Metabolol

Retail total =$165
Less 5% member discount =$156

SUPPLEMENT COST

- Supplement Regimen:

→ 8 separate pre-cycling aids
 11 separate aids during cycling
 9 separate aids post cycling

- Cost: $165 for 4 to 6 weeks supply

SUPPLEMENTS SOLD AT RANGER GYM, FT. BENNING

PRODUCT	TYPE	INGREDIENTS	COST
ProMax Bar	Protein supplement	20 grams protein/bar; glutamine, leucine, isoleucine, valine, whey protein, calcium caseinate	$1.5 per bar
Hydroxycut	`Thermogenic Metabolic Enhancer'	Chromium Picolinate, L-carnitine, Ma Huang	$34/bottle; 160/bottle; Dosage not to exceed 12/day
Phosphagen	`Cell Volumizer'	Creatine	$46.95/bottle; 70-90 day supply
Ultramet	Meal Replacement; 280 calories/serving	Whey protein, calcium caseinate, egg albumin, chromium picolinate, L-glutamine	$29.95 for 20 pkg
Cytomax	Exercise and Recovery Drink; 95 calories/serving	Alanine, glutamine, chromium, complex CHO, electrolytes	$24.95/82 servngs

SUGGESTED PERFORMANCE ENHANCERS

- Protein Powders
- Androstenedione
- Creatine
- Carnitine
- Ephedrine
- Yohimbe
- Antioxidants

Designer Protein's Active Peptide Transport™

...Some still are.

But it took almost 13 years and 22 international studies to absolutely confirm that peptides are the preferred method for the human body to absorb and utilize nitrogen. In fact, published research has shown that at certain times of the day, up to 70% of the nitrogen in blood is in peptide form.[2]

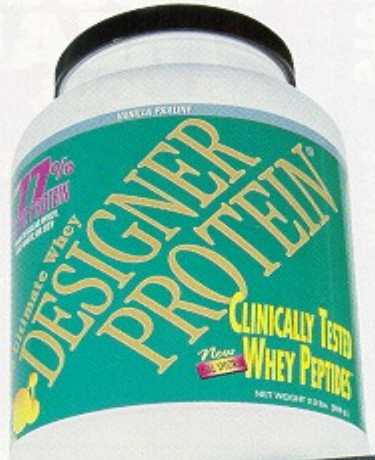
Today, Designer Protein gives you a patent-pending advantage that other proteins do not– Active Peptide Transport™

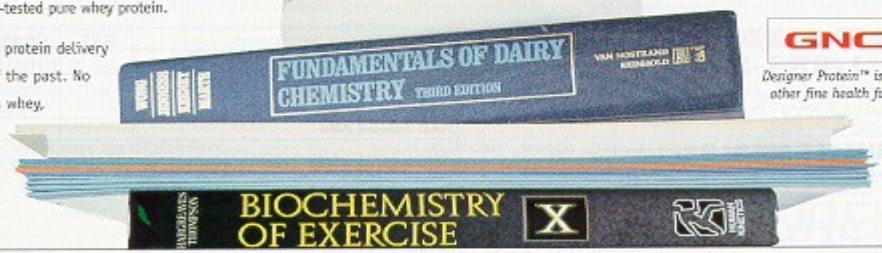
New for 1999, Designer Protein has Active Peptide Transport™ designed to allow more whey peptides to be absorbed...faster with less need for digestion. Active Peptide Transport™ is an extraordinary and unexpected discovery. That's what makes it patentable. But it should come as no surprise you'll only find Active Peptide Transport™ in Designer Protein. Bodybuilding's only scientifically-researched and clinically-tested pure whey protein.

Now, passive protein delivery is a thing of the past. No matter if it's whey.

The latest scientific research on protein stacks up to two questions.

- Is your protein powder active or passive?
- Does it have a patent pending?





ion-exchange whey, casein, caseinates, egg white or soy. Your protein powder is lacking without Active Peptide Transport™. And it doesn't cost you a red cent more.

As ever, The Ultimate Whey Designer Protein® is made with All-American Grade A milk from a USDA Certified Grade A facility. Something we challenge other proteins to match. Plus a percentage of each sale of Designer Protein still goes to fund new studies on protein metabolism. Exactly why we can bring you this new patent-pending discovery.

YOURS FREE This free Special Report gives you the full inside scoop on Designer Protein's new patent-pending discovery–Active Peptide Transport™ and how it can help you. Write in for this Special Report to "Designer Protein Special Report" Dept. B30, P.O. Box 2469, Carlsbad, CA 92018.

www.designerprotein.com

GNC LiveWell.

Designer Protein™ is available at GNC and other fine health food stores and gyms.

1. McArdle WD, Katch FI and Katch VL. *Exercise Physiology: Energy, Nutrition and Human Performance*, Philadelphia: Lea & Febiger, 1986, p. 134.
2. Zaloga GP. Studies comparing intact protein, peptide and amino acid formulas. In: *Uses of Elemental Diets in Clinical Situations*. Boca Raton: CRC Press, 1993, p. 204.

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PROTEIN INTAKE IN U.S.

- NHANES III:

→Protein consumed: 14-15% of total calories for males aged 20-29 and 30-39 years

- No deficit in protein intake by population

PROTEIN POWDERS

- Increased strength will enhance performance and reduce injuries
- Muscle growth thru ingestion of protein powders

PROTEIN POWDERS (CONT)

- **Uses:**

→ Increase muscle mass

PROTEIN POWDERS (CONT)

- **Mechanisms:**
  - → Extra protein for muscle growth
  - Energy source
- **Effects:**
  - Increased muscle mass
  - Enhanced strength

PROTEIN POWDERS (C0NT)

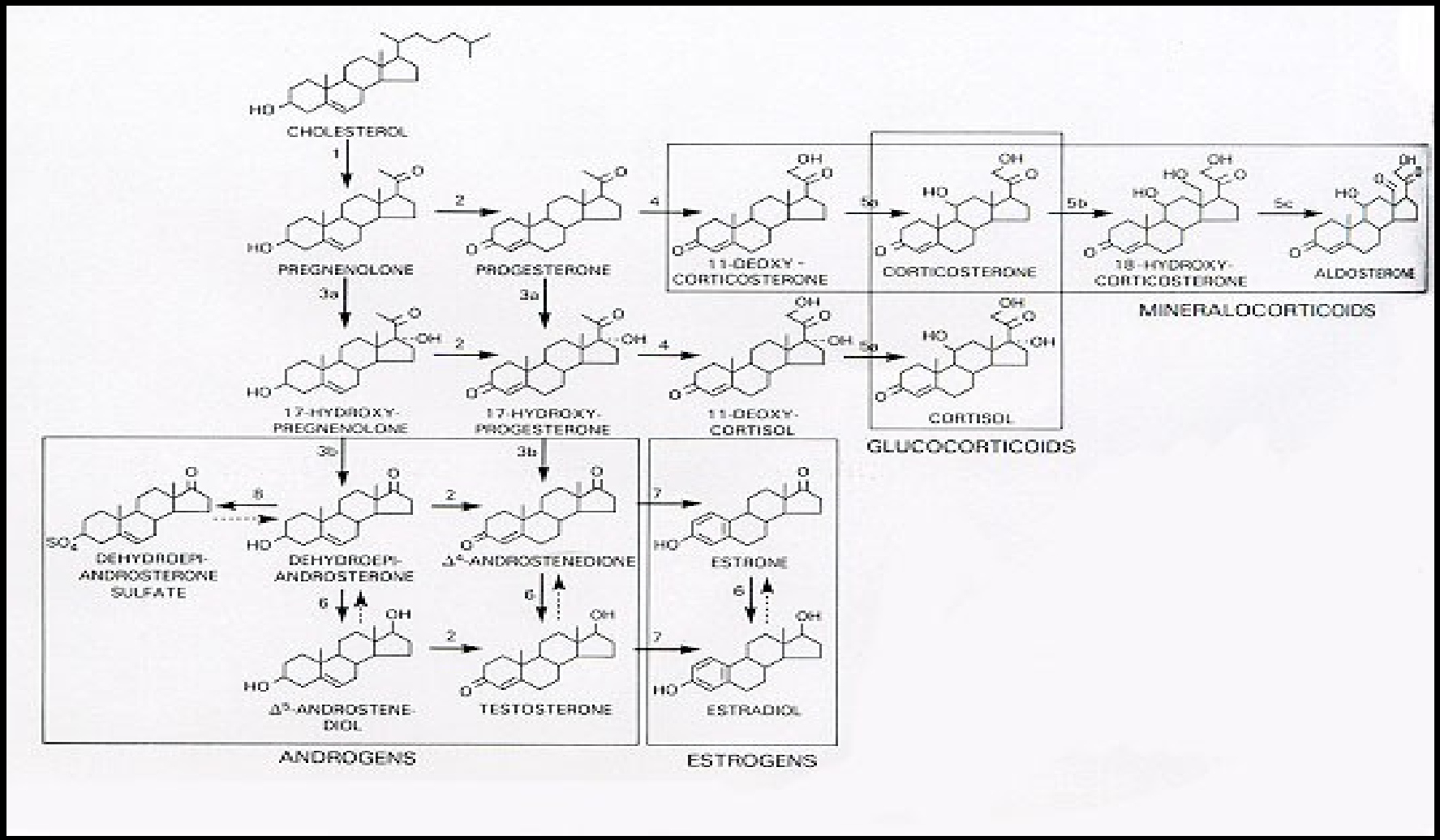
- **Studies:**
  - → Extra protein required during periods of active muscle building
  - No research to indicate protein supplements better than dietary protein
- **Safety:**
  - Generally safe
  - Not recommended in amounts greater than 2X RDI

MD
MUSCULAR DEVELOPMENT
WORLD'S AUTHORITY ON SPORTS NUTRITION, TRAINING & HUMAN PERFORMANCE
OLYMPIC DRUG SUMMIT: WHAT A JOKE!
Andro:
Secret Harvard Study
PERFORM!
ANABOLIC DIET FOR MAXIMUM GROWTH
EPO: BLOOD DOPING CRAZE
TRAIN WITH MARINERS' ALEX RODRIGUEZ "THE MICHAEL JORDAN OF BASEBALL"
SCIENCE SAYS: WHITE MEN CAN'T JUMP!
Home Run King Mark McGwire
May 1999
SEX, SPORT AND WOBBLY KNEES

ANDROSTENEDIONE

- **Uses and Effects:**
  - Enhance muscle growth & increase strength
  - Prevent muscle breakdown

ANDROSTENEDIONE

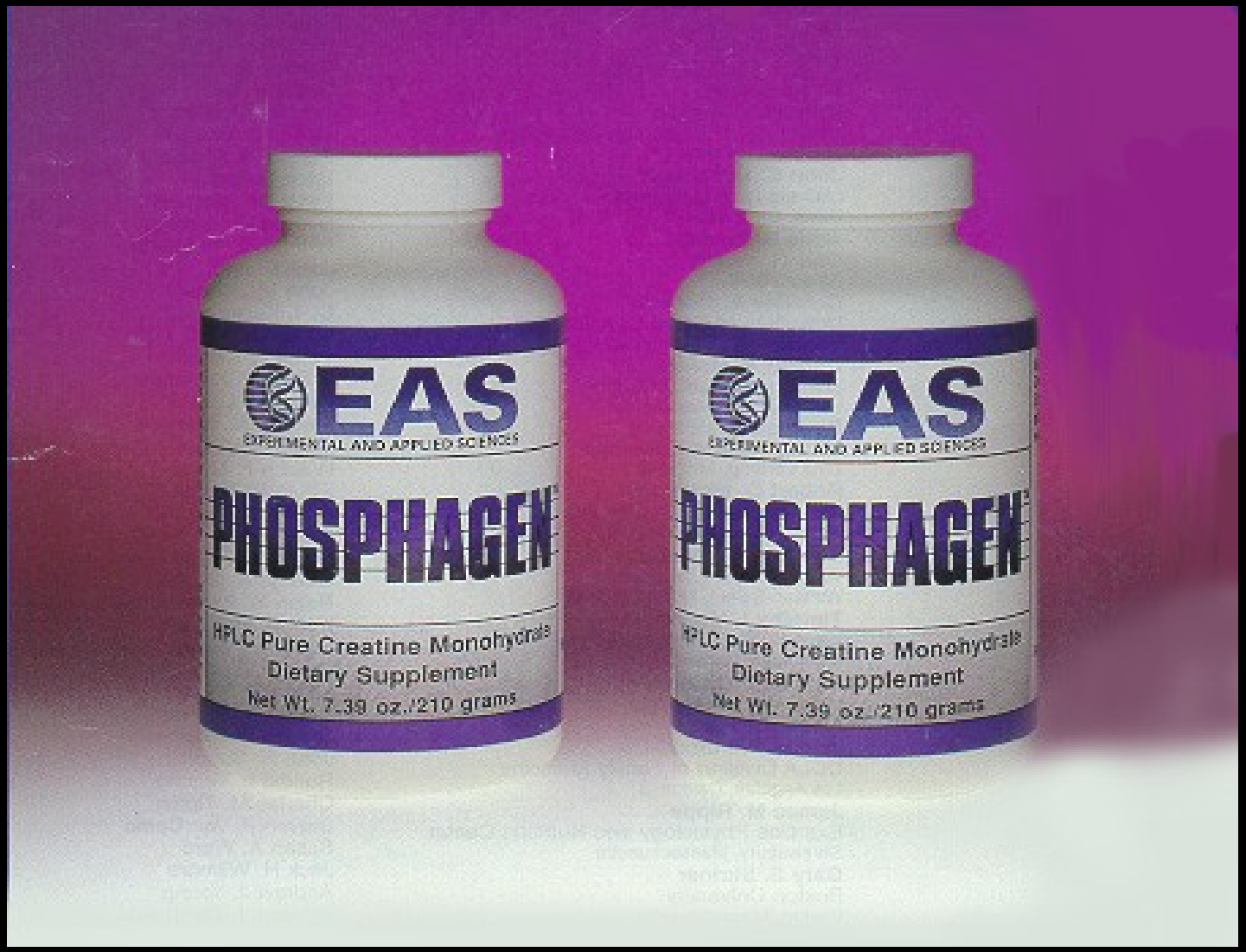


ANDROSTENEDIONE (CONT)

- **Studies:**
  - Few controlled studies available

ANDROSTENEDIONE (CONT)

- **Safety (AAS):**
  - Liver abnormalities, testicular atrophy, MI, HTN


EAS
EXPERIMENTAL AND APPLIED SCIENCES
PHOSPHAGEN
HPLC Pure Creatine Monohydrate
Dietary Supplement
Net Wt. 7.39 oz./210 grams
EAS
EXPERIMENTAL AND APPLIED SCIENCES
PHOSPHAGEN
HPLC Pure Creatine Monohydrate
Dietary Supplement
Net Wt. 7.39 oz./210 grams

Creatine Serum™ has been created with the human body in mind. We assimilate liquid far more easily than solids. So, when you take Creatine Serum,™ the energy boost of creatine goes to your muscles quickly. Without the side effects of dehydration and cramping powdered creatine causes.
Creatine Serum is the world's only stabilized liquid creatine. It's absorbed almost completely into your bloodstream in minutes. In fact, because this liquid is so easily absorbed by your body, a single 5ml serving is as effective as taking many spoonfuls of powder.
Creatine Serum is available in a number of formulations. ATP Advantage™ is for all athletes. ATP Plus Glucosamine™ aids joint repair, Femme Advantage™ is specially for women, and Prime Advantage™ is formulated for men over 35. Use Creatine Serum before your next workout. After all, your body needs its liquid.
ATP
ADVANTAGE

CREATINE

- **Uses:**
  - Increase power and speed
  - Increase body mass

CREATINE (CONT)

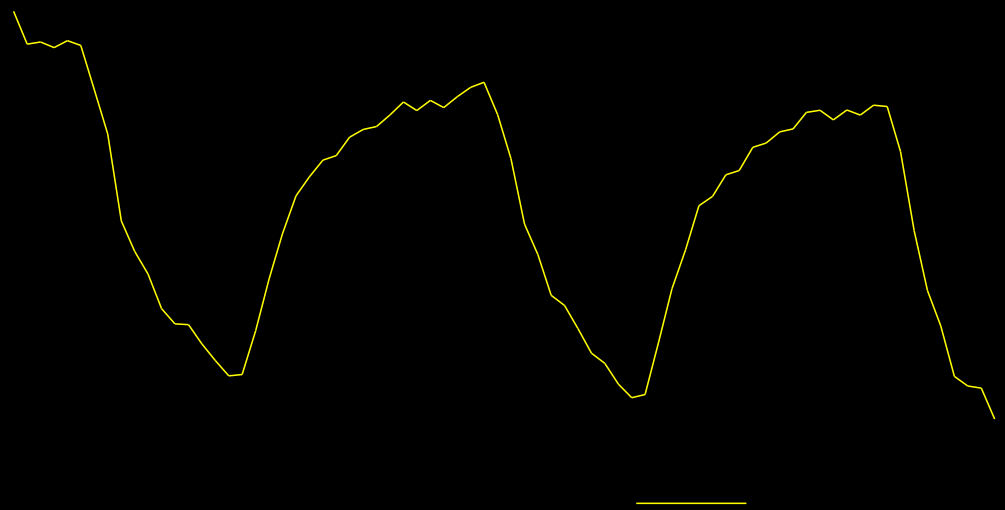
- **Mechanisms:**
  - Increase body creatine pool
  - greater capacity for immediate energy production
- **Effects:**
  - Increased body mass
  - Improve performance in short-term exercise
  - Decrease lactic acid accumulation

CREATINE (CONT)

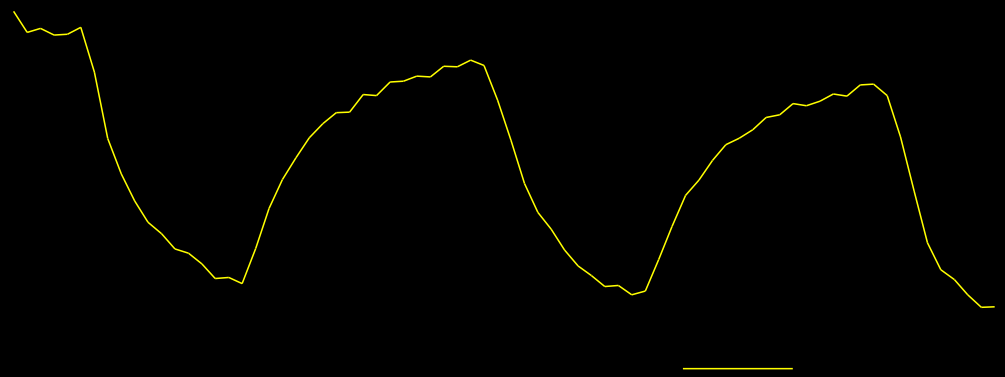
- **Studies:**

- **Short-term creatine supplementation improves work level intensity in strength performance test**
- **Creatine supplementation increases PCr resynthesis**

CREATINE SUPPLEMENTATION



GREATER PCr RESYNTHESIS RATE IN MIDDLE-AGED



CREATINE (CONT)

- **Safety:**
  - Muscle strains and sprains
  - Abdominal cramping
  - Long term effects unknown

THEY PUT IT IN OVERDRIVE.

anti-catabolic growth potentiating formula containing HMB, L-Glutamine, Creatine, NAC, Acetyl-L-Carnitine, Zinc and DHEA. This powerful formula can also help increase strength, power, body mass and recuperation.

MEGA GLUTAMINE FUEL: Glutamine is the most abundant free amino acid in skeletal muscle.* One hard gelatin capsule supplies 1,000 mg of the highest quality pharmaceutical-grade L-glutamine. A recent study found that an oral dose of only 2 grams of L-Glutamine elevated growth factors.*

ALC FUEL: One hard gelatin capsule supplies 1,000 mg of the highest quality, pharmaceutical-grade, anti-catabolic Acetyl-L-Carnitine(ALC). Available at GNC, VITAMIN WORLD, and other fine health food stores. www.twinlab.com *Melbourne, P.C., AM. J. Clin. Nut., 1995;61:1058-61.

TWINLAB® ftM™

Feed the Machine

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CARNITINE

- A nitrogen-containing acid synthesized from amino acids
- **Purported Uses:**
  - Increase fat availability for fuel
  - Improve aerobic capacity

CARNITINE (CONT)

- **Purported Mechanisms:**
  - Facilitate fat utilization for energy production
- **Effects:**
  - Improved exercise performance for pts with cardiovascular, respiratory disease, CRF

CARNITINE (CONT)

- **Studies:**
  - Equivocal results
- **Safety:**
  - Appears safe, though some side effects

If you're the kind of athlete who takes no prisoners, Twinlab® Diet Fuel could be the most important thing you lift all day. It's the most advanced thermogenic formula ever. As part of a low-fat, low-calorie diet and exercise program Diet Fuel® will help you reduce fat, retain lean mass and preserve serious muscle. So train hard, train proud, train naturally. And feed the machine with Twinlab Diet Fuel. It's the best way to do hard time. Available at GNC, VITAMIN WORLD and other fine health food stores.

TWINLAB®

www.twinlab.com

EPHEDRINE

- **Synthetic sympathomimetic drug**
- **Purported Uses:**

 Stimulant-type effect → Mental Strength

 Physical power

- **Mechanisms:**

 Activation of sympathetic response enhance muscle contractility, increase blood output to the heart, enlarge bronchial pathways to lungs

EPHEDRINE (CONT)

- **Purported Effects:**
  - Enhance aerobic endurance performance
- **Studies:**
  - Do not support use as performance-enhancing aid
- **Safety:**
  - Side effects including ha, dizziness, GI distress, irregular heartbeat, death

MMWR Report from the Centers for Disease Control

MMWR August 16, 1996: Adverse Events Associated with Ephedrine-Containing Products--Texas, December 1993-September 1995

During December 1993-September 1995, the Bureau of Food and Drug Safety, Texas Department of Health (TDH), received approximately 500 reports of adverse events in persons who consumed dietary supplement products containing ephedrine and associated alkaloids (pseudoephedrine, [illegible]

When it comes to male performance enhancers, Twinlab has it down to a science. Take Male Fuel. It's the ultimate male formula, combining standardized yohimbe bark extract with ginkgo biloba extract, natural vitamin E, vitamins B-5 and B-6 and saw palmetto extract.

Then there's Male Fuel Plus. It blends the best of our traditional Male Fuel formula with the highest quality DHEA there is.

But we didn't stop there. Tribulus Terrestris has been popular in Europe for years. Now, we're bringing it to you. Our Tribulus Fuel is a natural supplement that contains 625 mg per serving of the highest quality Tribulus Terrestris extract. And Tribulus Fuel Stack is not only the highest potency and highest purity Tribulus Terrestris you can find, we've even added 50 mg per serving of DHEA.

So look for our male performance enhancers at GNC LiveWell, WHOLE FOODS and other fine health food stores. One try and we're sure you'll feel as passionate about them as we do.

TWINLAB®

www.twinlab.com

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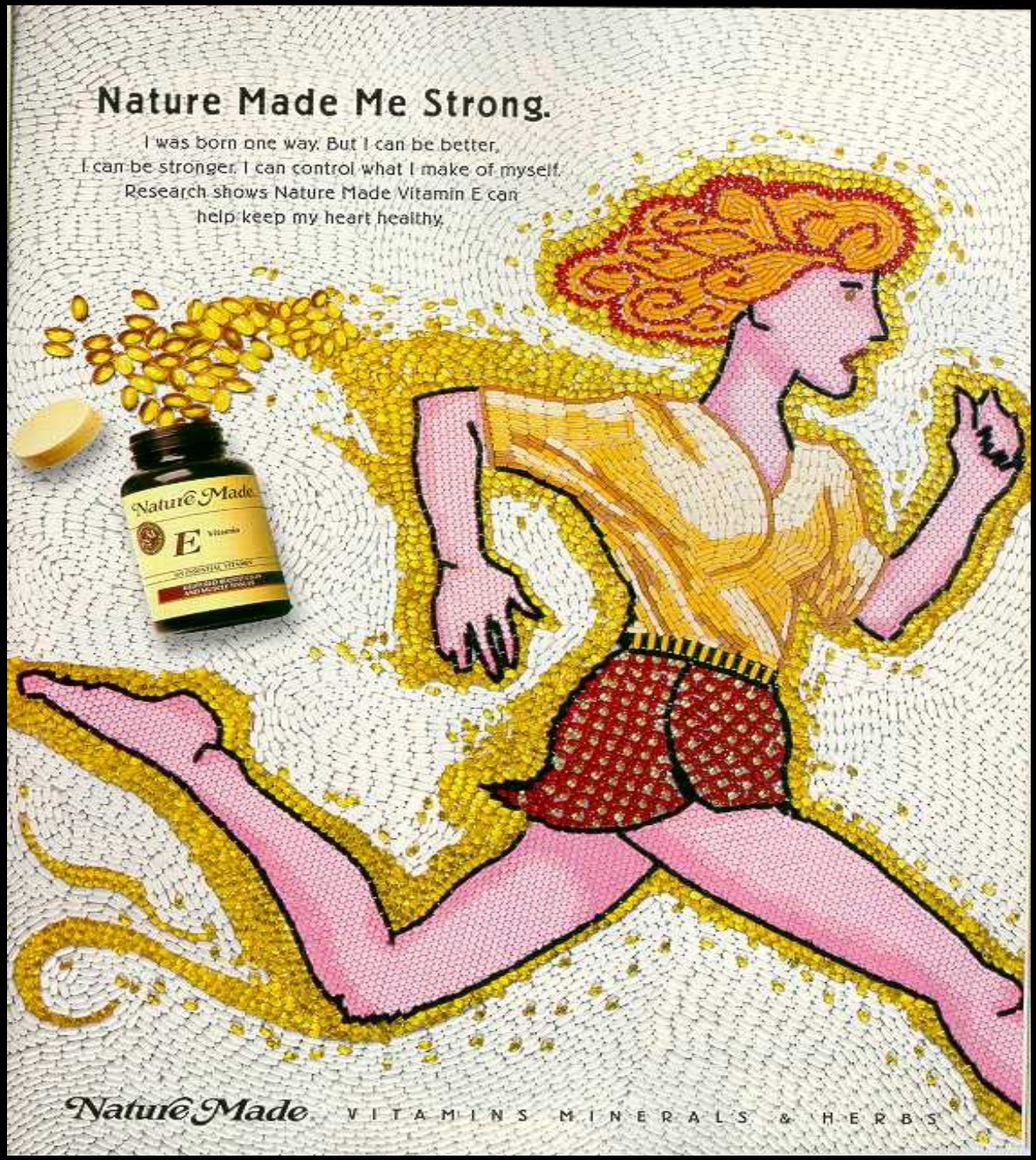
YOHIMBE

- **Derived from bark of yohimbe tree**
- **Purported Uses:**
  - Increasing muscle mass
  - Decreasing body fat
- **Mechanisms:**
  - Increased activity of parasympathetic system/decreased activity of sympathetic nervous system

YOHIMBE (CONT)

- **Purported Effects:**
  - Promoted as means of increasing testosterone increase muscle mass
  - Increase metabolism decreased body fat
- **Studies:**
  - Equivocal
- **Safety:**
  - Side effects such as dizziness, nervousness, ha, n/v, increased BP


Nature Made Me Strong.
I was born one way. But I can be better,
I can be stronger. I can control what I make of myself.
Research shows Nature Made Vitamin E can
help keep my heart healthy.
Nature Made
E
Nature Made VITAMINS MINERALS & HERBS

ANTI-OXIDANTS

- Include beta-carotene, vitamin E, vitamin C, and selenium
- **Uses:**
- Prevent or counteract the damaging effects of free radicals on tissue → enhance performance
- **Mechanisms:**
- Antioxidant supplements detoxify free radicals produced during exercise
- Play protective role in the process of lipid peroxidation

ANTIOXIDANTS (CONT)

- **Effects:**

- Ingestion of antioxidants can reduce muscle damage caused by free radical formation

- **Studies:**

- Equivocal: statistically non-significant reductions in lipid peroxidation

ANTIOXIDANTS (CONT)

- **Committee on Military Nutrition Research View**

- Committee on Military Nutrition Research found little evidence to indicate that supplementation of vitamin C, vitamin E, and beta-carotene would be beneficial in protecting against short-term, acute oxidative stress

COMMITTEE'S QUESTIONS

- What is the strength of the evidence to suggest that oxidative stress is a concern for the service members during extremes of physical activity and other stresses encountered in training and operations?

COMMITTEE'S QUESTIONS (CONT)

- What is the strength of the evidence that vitamin C, vitamin E, and/or beta-carotene are likely to protect health and performance of service members exposed to multiple environmental stresses during military training and operations (e.g., severe air pollution in some urban environments; radiation hazards to crew at altitude; radio frequency radiation hazards on ships and around communications facilities; lung and tissue blast overpressure effects and physical and psychological stresses in extreme training courses such as Ranger training and USMC Crucible training?

COMMITTEE'S QUESTIONS (CONT)

- Is there evidence of any health risk associated with supplementing intakes of vitamin C, vitamin E, and B-carotene by service members with the intention of maintaining health and performance in adverse military training and operational environments

ANTIOXIDANTS (CONT)

- **Safety:**

→ Excessive amounts can produce significant side effects

CONCLUDING REMARKS

- Fact versus Reality

SELECT REFERENCES

- Andres LPA. And Sacheck J. `A Review of creatine supplementation: side effects and improvements in athletic performance,' (unpublished review)
- AR 40-25. NAVMEDCOMINST 10110.1.AFR 160-95. Nutrition Allowances, Standards, and Education. (in revision)
- Arsenault J and Kennedy J. `Dietary supplement use in U. .S. Army special operations,' Military Medicine, (in preparation)
- Dekkers JC. Van Doornen LJP. Kemper HCG. `The role of antioxidant vitamins and enzymes in the prevention of exercise-induced muscle damage,' Sports Medicine, vol 21, Mar, 1996
- Heinonem OJ. `Carnitine and physical exercise,' Sports Medicine, vol 22, Aug, 1996.
- Institute of Medicine , Nutritional Needs in Cold and in High-Altitude Environments, Marriott B & Carlson S, ed. Natl Academy Press, Washington, D.C., 1996
- Institute of Medicine, Nutritional Needs in Hot Environments, Marriott B, ed., Natl Academy Press, Washington, D.C., 1993.
- King DS, Sharp RL, Vukovich MD, et al. `The effect of oral androstendione on serum testosterone, strength, lean mass, blood lipid profiles, and liver function during resistance training in young adult males', JAMA, (in preparation)
- Lemon PWR. `Do athletes need more dietary protein and amino acids?' Internatl J Sport Nutr, vol. 5, supplement, 1995.
- Schneider K. Henvig L. Ensign WY. et al. `Use of supplements by U.S. Navy SEALS,' Med & Sci in Sports & Ex, vol 30: 5 abstract in supplement, May, 1998.
- Williams, Melvin, The Ergogenics Edge, Human Kinetcs, Champaign, Il., 1998.
- Wolinsky I, ed. `Dietary supplements as ergogenic aids,' in Nutrition in Exercise and Sport, 3rd ed., CRC Press, NY, 1998.